

WHAT IS CLAIMED IS:

- 1 1. An apparatus comprising:
2 a substrate; and
3 a carbon nanotube layer deposited on the substrate, the carbon nanotube layer
4 including an alkali material. ✓
- 1 2. The apparatus as recited in claim 1, wherein the alkali material is deposited as a layer
2 onto the carbon nanotube layer.
- 1 3. The apparatus as recited in claim 1, wherein the alkali material is doped into the
2 carbon nanotube layer.
- 1 4. The apparatus as recited in claim 1, wherein the alkali material is intercalated with
2 the carbon nanotube layer.

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- 1 5. An apparatus comprising:
2 a substrate; and
3 a carbon nanotube layer deposited on the substrate, the carbon nanotube layer
4 including a separate low work function material.
- 1 6. The apparatus as recited in claim 1, wherein the low work function material is
2 deposited as a layer onto the carbon nanotube layer.
- 1 7. The apparatus as recited in claim 1, wherein the low work function material is doped
2 into the carbon nanotube layer.
- 1 8. The apparatus as recited in claim 1, wherein the low work function material is
2 intercalated with the carbon nanotube layer.
- 1 9. The apparatus as recited in claim 1, wherein the low work function material is an
2 alkali material.
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1 10. A field emission apparatus comprising:
2 a cathode comprising:
3 a substrate; and
4 a carbon nanotube layer deposited on the substrate, the carbon nanotube layer
5 including an alkali material.

1 11. The apparatus as recited in claim 10, wherein the alkali material is deposited as a
2 layer onto the carbon nanotube layer.

1 12. The apparatus as recited in claim 10, wherein the alkali material is doped into the
2 carbon nanotube layer.

1 13. The apparatus as recited in claim 10, wherein the alkali material is intercalated with
2 the carbon nanotube layer.

1 14. The apparatus as recited in claim 10, further comprising a conductive layer deposited
2 between the substrate and the carbon nanotube layer.

- 1 15. A method for making a field emission cathode comprising the steps of:
2 providing a substrate;
3 depositing a carbon nanotube layer on the substrate; and
4 inserting an alkali material into the carbon nanotube layer.
- 1 16. The method as recited in claim 15, wherein the inserting step further comprises the
2 step of:
3 depositing a layer of the alkali material on the carbon nanotube layer.
- 1 17. The method as recited in claim 15, wherein the inserting step further comprises the
2 step of:
3 doping the carbon nanotube layer with the alkali material.
- 1 18. The method as recited in claim 15, wherein the inserting step further comprises the
2 step of:
3 intercalating the alkali material into the carbon nanotube layer.